

**Attorney Docket No. 13DV-13672 (07783-0086)**  
**Serial No. 10/726,357**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of SKOOG et al. :  
Serial No. 10/726,357 : Group Art Unit 1762  
Application Filed December 3, 2003 : Examiner: Turocy, David P.

**For: SPRAYABLE NOBLE METAL COATING FOR HIGH TEMPERATURE USE  
DIRECTLY ON CERAMIC AND SMOOTHCOAT COATED AIRCRAFT  
ENGINE ALLOYS**

**DECLARATION UNDER 37 CFR § 1.132**

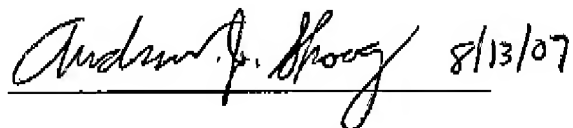
Andrew J. Skoog, hereby certifies the following:

1. I am a joint inventor of all the claims of the patent application identified above and I am a joint inventor of the subject matter described and claimed therein.
2. I have extensive knowledge of the compositions of ceramic and ceramic coated metallic materials and coatings applied over the substrates of ceramic and ceramic coated metallic materials, including reflective coatings.
3. I have observed differences in durability of a reflective coating applied over a substrate of ceramic and ceramic coated metallic materials when the reflective coating is applied by methods consisting of air-assisted spraying, airless spraying, brushing and decal transfer, when compared to other application methods. These differences in durability include enhanced inhibition of the reflective coating to erosion, corrosion and diffusion into the substrate of ceramic and ceramic coated metallic materials.
4. I have observed differences both in the duration and the magnitude of temperature that can be withstood by a reflective coating applied over a substrate of ceramic and ceramic coated metallic materials when the reflective coating is applied at ambient temperature and pressure conditions by methods consisting of air-assisted spraying, airless spraying, brushing and decal transfer, when compared to other application methods. These differences include the reflective coating having the capability not only to withstand higher temperatures, but also to withstand those higher temperatures for durations exceeding that of reflective coatings applied by different methods.
5. Included with this Declaration are Figures 1-4, based on testing conducted from April to June of 2002 (Figures 1-3), and November 2006 (Figure 4). Figures 1-3 relate to testing Inconel 625® coupons which were each overcoated by a thermal barrier coating, followed by a smoothcoat layer that was then coated with a layer of ceramic barrier coating applied by air-assisted spraying and finally, by a reflective coating mixture of A4707 platinum and N Gold applied by air-assisted spraying. Figure 4 relates to testing an Inconel 625® coupon that was coated with a reflective coating mixture of platinum APP100A applied by air-assisted spraying. Figure 1 was subjected to a 1,650°F

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environment for one hour. Figure 2 was subjected to a 1,650°F environment for one hour and then aged for 50 hours in a 1,650°F environment. Figure 3 was subjected to a 1,650°F environment for one hour, subsequently aged for 50 hours in a 1,650°F environment, subjected to a 1,800°F environment for one hour, and finally aged for 25 hours in a 1,800°F environment. Figure 1 was subjected to a 1,400°F environment for one hour. Each of Figures 1-4 show the hemispherical reflectance properties for reflectance angles of 10, 30, 50 and 70 degrees on the coated coupon.

6. I have observed differences both in the duration and the magnitude of temperature that can be withstood by a reflective coating applied to the substrates of ceramic materials, including ceramic matrix composite materials, as well as ceramic coated metallic materials different from Inconel® materials when the reflective coating is applied at ambient temperature and pressure conditions by methods consisting of air-assisted spraying, airless spraying, brushing and decal transfer, when compared to other application methods.
7. Since airless spraying, brushing and decal transfer are also applied at ambient temperature and pressure conditions, the unexpected results associated with air-assisted spraying identified in item 5 also apply for airless spraying, brushing and decal transfer.
8. It is my belief, based on at least these observations, including test results as shown in Figures 1-4, that application combination of a reflective coating over ceramic or ceramic coated metallic materials at ambient temperature and pressure conditions by methods consisting of air-assisted spraying, airless spraying, brushing and decal transfer, cannot be considered to be a "conventional" method of application, when compared to other previously used application methods.
9. I hereby acknowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon, and I hereby declare that all statements made in this declaration of my own knowledge are true and that all statements made on information and belief are believed to be true.

 8/13/07

Andrew J. Skoog

## Noble Metal Heat Rejection on Smooth Ceramic

Inconel 625 Coupon + TBC + Smoothcoat + Barrier + Noble Metal

1650-1HR

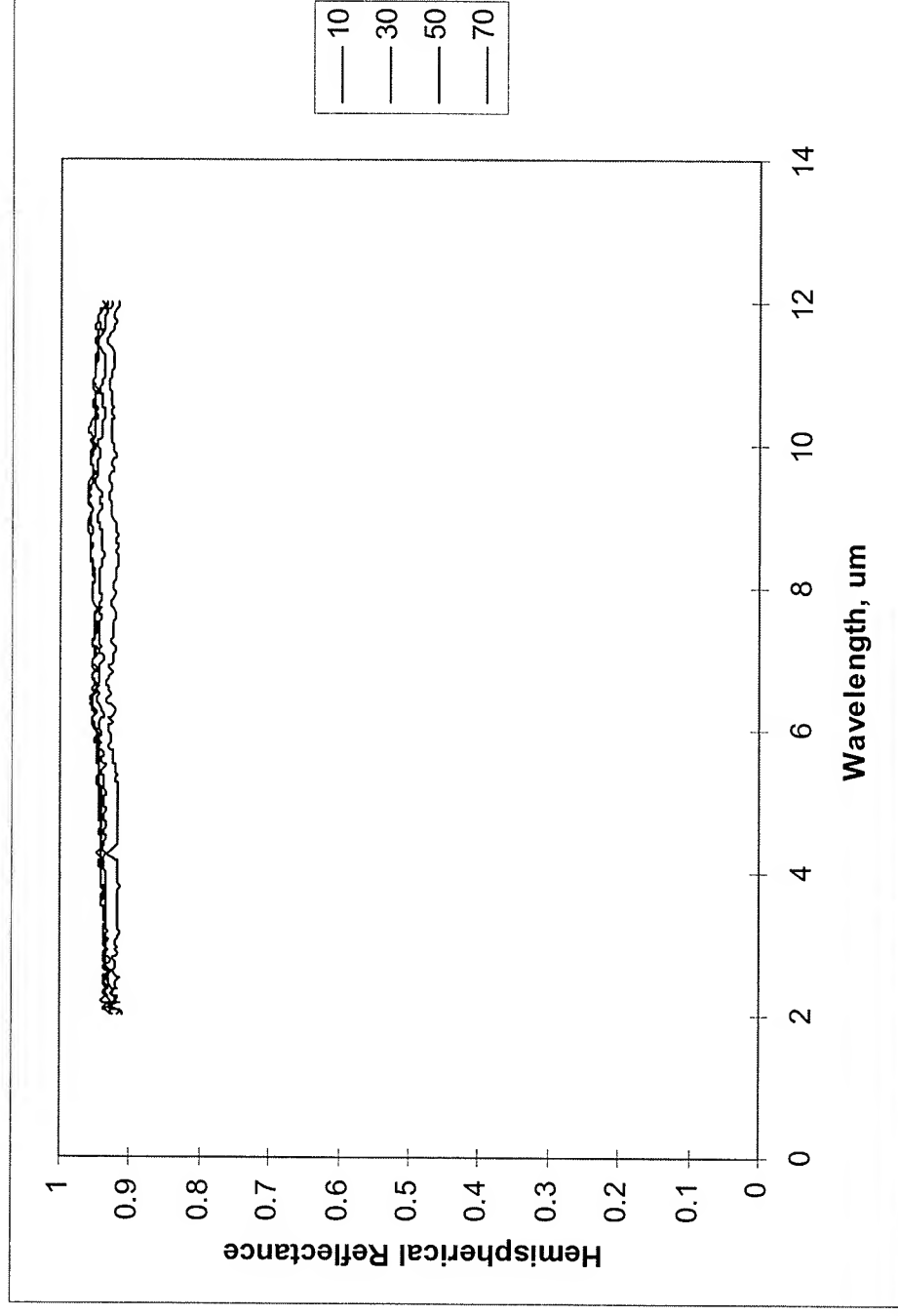


Figure 1

**Noble Metal Heat Rejection on Smooth Ceramic  
Inconel 625 Coupon + TBC + Smoothcoat + Barrier + Noble Metal**

**1650-1HR, AGE 1650-50HR**

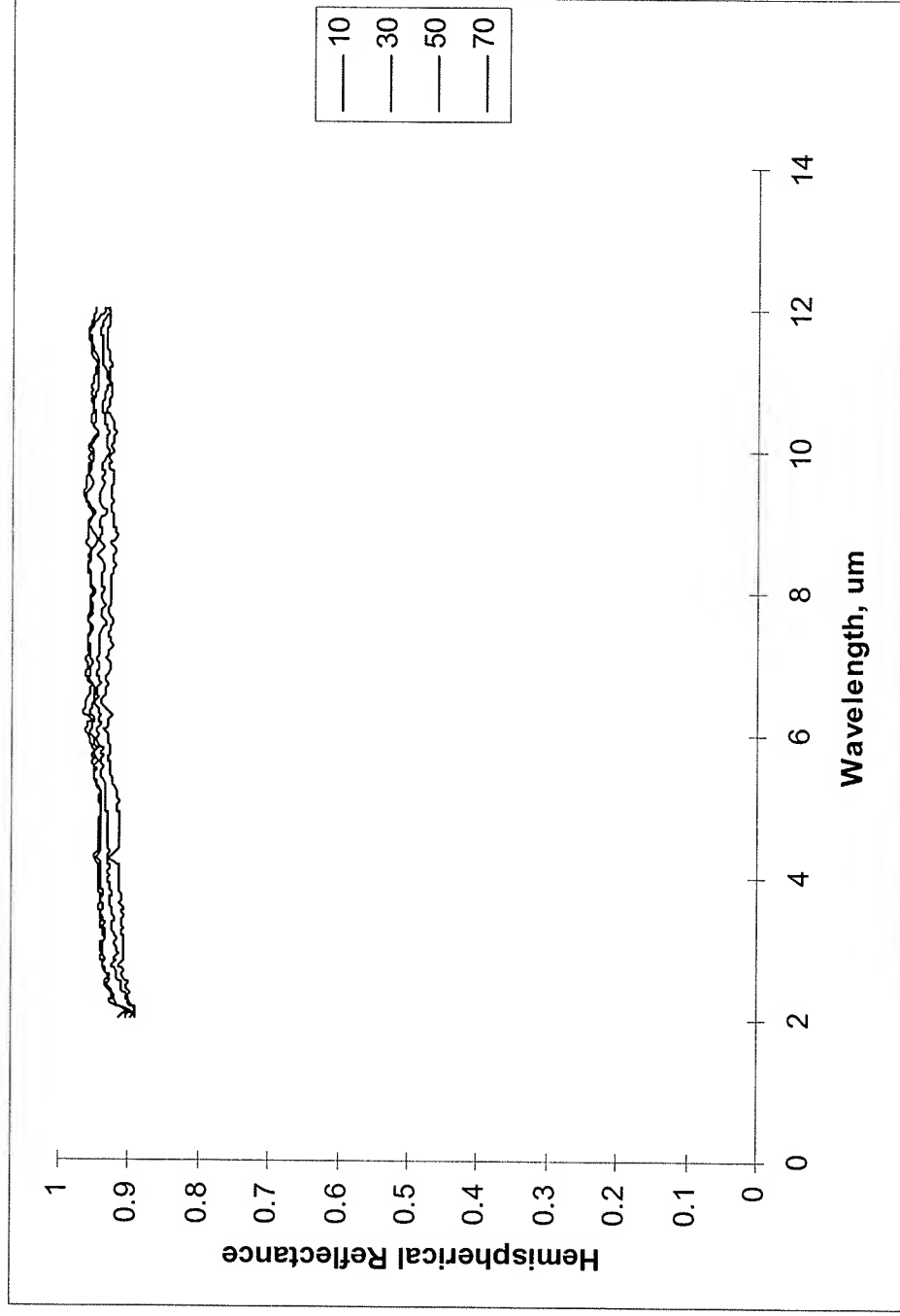


Figure 2

## Noble Metal Heat Rejection on Smooth Ceramic

### Inconel 625 Coupon + TBC + Smoothcoat + Barrier + Noble Metal

1650-1HR, AGE 1650 – 50 HRS, 1800-1HR, 1800-25HRS

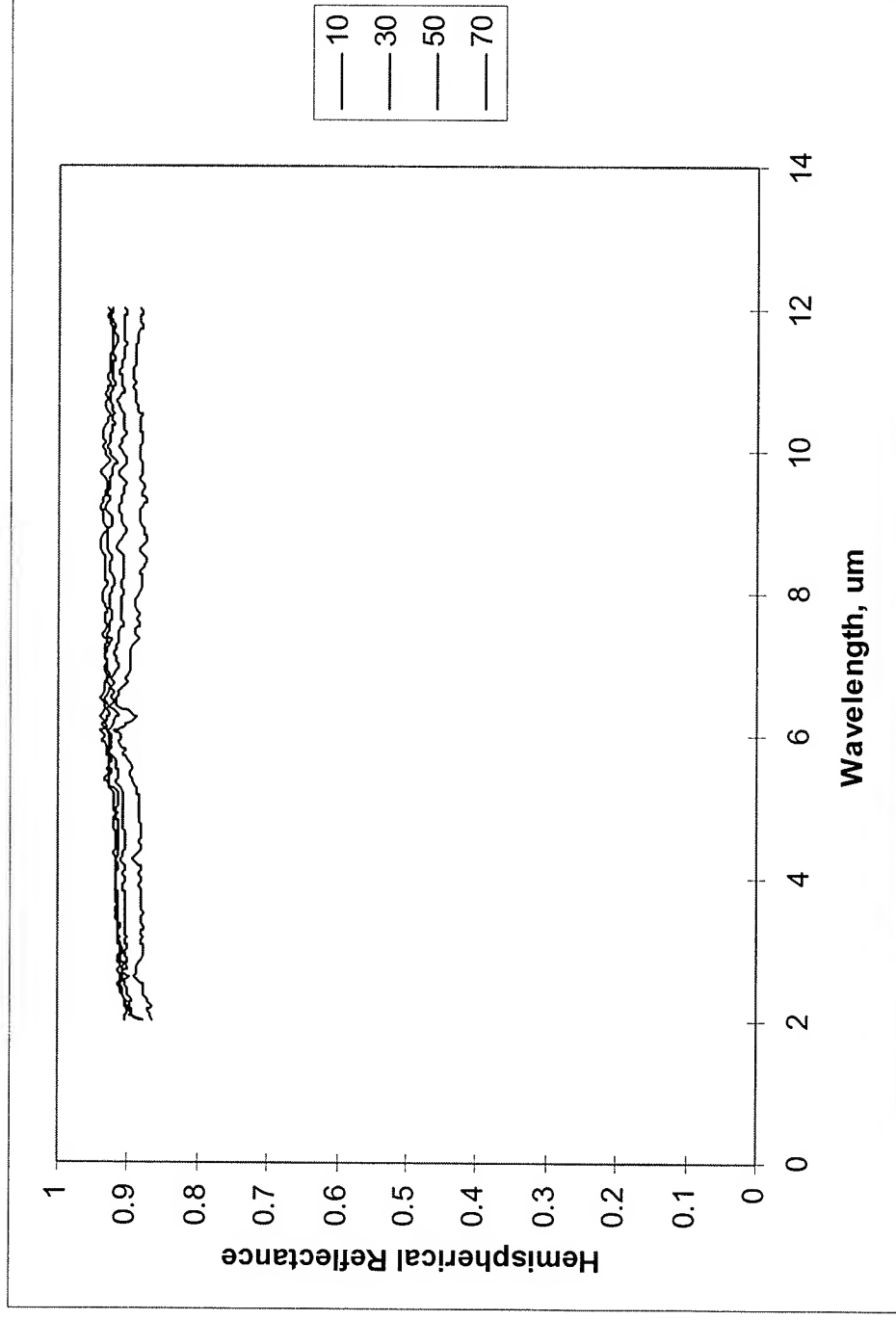


Figure 3

INCONEL 625 w/ PLATINUM APPLIED

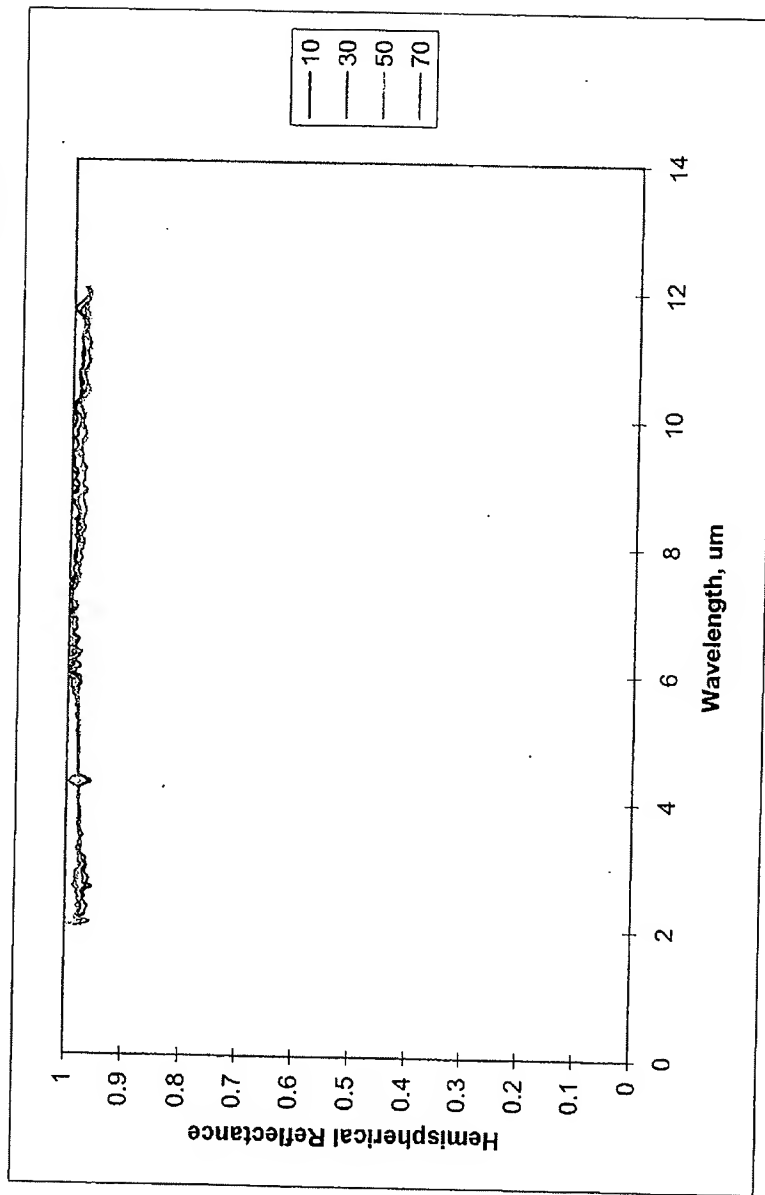


FIGURE 4